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FINAL DRAFT  
ASHTABULA CLOSURE PROJECT  
RISK-BASED END STATE  
VISION

November 6, 2003

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## EXECUTIVE SUMMARY

The Ashtabula Closure Project (ACP) includes the remediation of a 43-acre site in compliance with the *Decommissioning Plan for RMI Titanium Company Extrusion Plant, Ashtabula, Ohio; RDP-ESH-007* (the DP). The site is owned by the RMI Titanium Company (RMI) and operated by RMI Environmental Services (RMIES), a division of RMI. The objectives of the ACP are to safely remediate facilities and grounds to reduce residual radioactive and hazardous material contamination to levels that permit the site and adjacent areas to be released for unrestricted use. Restoration includes, but is not limited to, the removal and/or decontamination of buildings, concrete slabs, foundations, utilities, and other facilities, soils, and groundwater.

The original mission at the Site was the production of slightly enriched uranium and thorium shapes for the Department of Energy; this mission ended in 1988. Following completion of Site restoration, the Department of Energy will no longer have a presence at the Site.

Current land use and zoning at the site and vicinity is primarily for heavy industry or central businesses. Adjacent properties for example, include a chemical production plant, a commercial scrap recycling yard, the former RMI Titanium Company Metals Reduction Plant, a trucking firm, and several tracts of undeveloped land that are zoned for either heavy industrial or central business usage. Future activities related to the ACP site is assumed to be industrial related, however, no specific plans have been identified by the site owner, RMI.

Remaining hazards associated with this site are primarily related to three soil contaminants as identified in the NRC-approved Site DP – uranium, technetium (Tc-99), and trichloroethylene (TCE). Uranium and Tc-99 contamination are directly related to the 24 years of uranium extrusion processing. This contamination is primarily surficial except in localized areas where infrastructure leaks (i.e. from sumps, process drains and below grade tanks) have occurred. The primary receptor for these contaminants would be to a Maximally Exposed Individual (MEI) either by direct contact with soil and surface water or inhalation of dust particles.

TCE contamination is essentially limited to a less than 1-acre area where an unauthorized release occurred in an evaporation pond sometime prior to 1972. This pond area is the only identified location where groundwater contamination has been confirmed. TCE, U & Tc-99 all exceed drinking water Maximum Contamination Levels (MCLs). The pond area is regulated under the Resource Conservation and Recovery Act (RCRA) via the Ohio Environmental Protection Agency (OEPA) and will be remediated in accordance with the associated hazardous waste management permit.

Importantly, current radiological clean-up criteria, based on a maximum exposure of 25 mR for a hypothetical resident farmer, are being reviewed to determine their consistency with standard practice. DOE has recently completed RESidual RADioactivity (RESRAD) and toxicological risk analyses using most recent site data. Preliminary

results indicated the current clean-up requirements may be more conservative than what is required by current regulations (reference table Soil Cleanup Levels, Table No. 1). It is also required that clean-up will satisfy unrestricted land use criteria, including groundwater. Under an industrial clean-up scenario, unrestricted land use may not be practical. Such changes to current approved clean-up agreements will require considerable coordination both with RMI Titanium Company and the regulations.

## **1.0 Introduction**

The ACP is a Decontamination and Decommissioning (D&D) project at a site where uranium was previously extruded and/or closed-die forged under contract to the DOE and its predecessor agencies. The primary Contaminants Of Concern (COCs) driving D&D are uranium, technetium-99 (Tc-99) and trichloroethylene (TCE). The site was formerly known as the RMI Extrusion Plant and is currently owned by RMI Titanium Company (RMI). RMI Environmental Services (RMIES), a division of RMI, is conducting the D&D project as specified by Contract DE-AC24-93CH10555 between RMI and DOE. RMIES holds Ohio Department of Health License #11900040004 which authorizes the possession of uranium and technetium-99 *“incident to decommissioning, including decontamination and dismantlement of buildings, equipment and other structures; remediation of contaminated soil; restoration of contaminated soil; restoration of contaminated groundwater; waste disposal; and restoration of affected areas.”*

Primary Parties with an interest in the ACP RBES Vision include; DOE, RMI, the Ohio Department of Health (ODH) and the Ohio Environmental Protection Agency (OEPA). These parties have historically shared a vision for the End State that allows for unrestricted use of the site after closure. This End State Vision of D&D resulting in unrestricted use of the site after closure is summarized in a foundational document *Decommissioning Plan for RMI Titanium Company Extrusion Plant, April 1995* (Decommissioning Plan), page ES-1: *“DOE’s Office of Restoration and Waste Management has contracted RMI Titanium Company Contract (through) No. DE-AC24-93CH10555, to conduct the RMI Decommissioning Project (RMIDP – now redesignated the ACP) to satisfy DOE’s liability by removing all radiological and hazardous contaminants to levels which will allow the facility and adjacent areas to be released for unrestricted use.”* The Decommissioning Plan has served as the driver for the ACP since 1997 when it was approved by the Nuclear Regulatory Commission (NRC), and subsequently adopted by ODH.

OEPA has jurisdiction over a RCRA Waste Management Unit (WMU) which contains TCE-contaminated soil and groundwater. The WMU is also contaminated with uranium and Technetium-99. Although the OEPA End State Vision for the site also includes unrestricted use of the WMU area after closure, the specific term “unrestricted use of the site after closure” is not part of the OEPA vocabulary. Rather, OEPA Permit 02-04-0678 speaks of an equivalent closure point of *“no further action”* which is reached when the permittee demonstrates that *“there are no releases of hazardous waste or constituents*

from WMUs at the Facility that pose a threat to human health and the environment (section F.8 (a)).

The End State Vision as historically documented is currently being reviewed against alternative scenarios such as industrial future use rather than residential. DOE/RMI have recently conducted risk-based analyses and determined that Residential Farmer unrestricted release criteria, as currently required, may be too restrictive. Upon confirmation of these analyses, DOE/RMI may petition the regulators to reconsider appropriate clean-up requirements and future use conditions/restrictions. This issue also has RMI/DOE contract implications. Regardless of the ultimate clean-up numbers required for compliant site release, the End State will be as depicted in Figure 4.2. At this time only two facilities, the Guardhouse and the Operations Building, will remain.

Table 1; Soil Cleanup Levels

<u>Contaminant</u>		<u>Uranium</u>	<u>Tc-99</u>	<u>TCE</u>	Total Soil - Estimated Tons
Current Requirement		30 pCi/g	65 pCi/g	22.6 mg/kg	42,353
Revised RESRAD – Residential Farmer	Groundwater	157 pCi/g	28 pCi/g	20 mg/kg	23,332
	No Groundwater	204 pCi/g	TBD	TBD	TBD
Industrial – Per RESRAD	Groundwater	768 pCi/g	17,300 pCi/g	72 mg/kg	9,800
	No Groundwater	1,082 pCi/g	805,000 pCi/g	TBD	~8,500

### 1.1 Organization of the Report

This RBES Vision report is organized in accordance with Appendix A, Format for the RBES Vision Document from DOE's *Guidance for Developing Risk-Based, Site-Specific End State Vision*, September 11, 2003. This guidance uses a standardized approach for generating and using site maps and conceptual site models to portray the End State Vision. The maps presented in this document are intended to present and allow comparisons between current and future land use and enable the geographical depiction of hazards, their associated risks, and the affected populations or potential receptors.

In accordance with the DOE guidance for small sites, only End State maps are provided for Regional Context, Site Context, and Hazard-Specific map types. The Conceptual Site Models (CSM) provide, in block diagram form, information regarding the hazards, pathways, receptors, and barriers (current or planned) between the hazards and the receptors.

## 1.2 Site Mission

### Past Mission

*RMI Titanium Company Extrusion Plant (RMI) was a prime contractor to the U.S. Department of Energy (DOE) from 1962 through August 1987. From September 1987 through November 1992, RMI was a subcontractor to the Fernald Environmental Management Program (FEMP) operated by Westinghouse Environmental Management Company of Ohio (WEMCO). RMI operated as a prime contractor to DOE-Oak Ridge Operations from December 1, 1992 through March 31, 1993 at which time the contract transferred to the DOE-Chicago Operations Office. Effective April 1, 1995 the prime contract was transferred to the DOE/Ohio Field Office.*

*Beginning in 1962 the primary function of RMI was to extrude depleted, normal, and slightly enriched uranium (up to 2.1 weight percent U-235) metal, and experimental quantities of thorium for the DOE. The uranium was extruded into rods, tubes or other shapes as an intermediate step in the production of nuclear fuel elements at other DOE sites. RMI was also licensed to extrude depleted and natural uranium under an NRC license SMB-602 and extruded non-radioactive metals (primarily copper based) for the commercial sector. However, the majority of the material processed at the facility was for the DOE. Uranium extrusion work ceased in September 1988 and all extrusion operations at RMI ceased on October 31, 1990. (Decommissioning Plan, page 1-1.)*

Uranium, Tc-99, and trichloroethylene (TCE) are the primary contaminants associated with the past extrusion activities. Because recycled uranium was extruded for DOE at the site and since Tc-99 is a contaminant in recycled uranium, the site was contaminated with Tc-99 along with the uranium. TCE was used at the site as a degreasing agent in the DOE uranium extrusion process from 1962 to 1966 and for degreasing tools until 1972.

There are several pathways by which it is believed that the site was contaminated with uranium, Tc-99 and TCE. An unlined pond was formerly located at the site, which is now part of the RCRA WMU area. The pond was used for disposal and evaporation of a sodium nitrate solution that was generated as a result of the neutralization of a spent pickling solution of nitric acid. The pickling solution picked up small quantities of the uranium and Tc-99, which subsequently contaminated the soil and groundwater beneath the pond. In addition, when the pond overflowed, the contaminated water flowed through a swale leading from the pond over an embankment to low-lying areas north of main plant area, thus contaminating these northern areas, as well. It is also believed that a single unauthorized disposal of TCE into the evaporation pond occurred during or before 1972. The pond was closed in 1984. Other pathways for the past spread of uranium and Tc-99 were; vehicle and foot traffic, air emissions, facility maintenance activities, contaminated backfill and storm water run-off.

### Current Mission

DOE has contracted RMI Titanium Company (Contract No. DE-AC24-93CH10555) to conduct the RMI Decommissioning Project (RMIDP – now the ACP) to remediate radiological and hazardous contaminants to levels that will allow the facility and adjacent areas to be released for unrestricted use. The current mission however, is being re-evaluated to determine if a restricted release under an industrial land use condition is more appropriate.

The pathways which allowed the spread of contamination during production years as described in the above section “Past Mission”, have largely been eliminated. The evaporation pond has been removed. Up until early 2002, fixed ventilation units with stacks equipped with HEPA filters were used for D&D activities that had the potential to emit contaminated dust. Portable ventilation units equipped with HEPA filters are currently used. Fugitive dust is controlled by water misting. Personal and area air monitoring for radiological contaminants occurs on an ongoing basis. Only tested, clean soil from off-site is used for backfilling. The spread of contamination via storm water is controlled using silt fencing or hay bales and a french drain system that collects potentially contaminated storm water and directs it to a monitored outfall.

Some tracking of contamination may still occur within the restricted area during current D&D activities as contaminated soil, concrete and other debris are moved from their original locations to the rail spur for shipment to disposal facilities. However, this movement is restricted along known corridors that will be remediated, if necessary, as part of project completion.

### Future Mission

The future mission of the site is most likely industrial, however residential and agricultural uses are possible if a restricted industrial land use condition is not approved. Future land use decisions will be the responsibility of RMI, the site owner; DOE will no longer have a mission or presence at the site. The site itself is located in Ashtabula Township; the boundary between Ashtabula Township and the City of Ashtabula is along the west side of the site. The site and adjacent properties within Ashtabula Township are zoned M-2, “Heavy Industry” use. Adjacent properties within the City of Ashtabula are zoned C-3, “Central Business”. To the northwest, within the C-3 designated zoning, is a large wooded area that is planned for development by the City of Ashtabula. Contiguous to the site on the north side is Fields’ Brook, a former National Priorities List Superfund Site. Fields’ Brook remediation was completed in January of 2003. Fields Brook flows into and has impacted the Ashtabula River.

## **1.3 Status of Cleanup Program**

Section 4 describes the two “Hazard Areas” at the site: (1) Contaminated Buildings and Non-waste Management Unit soils (2) the Resource Conservation and Recovery Act

(RCRA) Waste Management Unit (WMU) Soils and Groundwater.

*Contaminated Buildings and Non-waste Management Unit Soils*

As discussed in Section 4.1, eleven buildings currently remain on the site. The End State Vision for the site includes only two of those buildings – the Operations Building and the Guardhouse. It is expected that the other nine buildings will be either demolished or free released and removed from the site as part of project completion.

The current End State Vision for the site calls for the removal of concrete pads, building foundations/footers, sumps and buried utility lines. Currently, most concrete pads associated with demolished buildings have been removed but the associated foundations/footers, sumps and utilities remain; they are scheduled to be removed in FY2004. The foundations/footers, sumps and utilities associated with the nine buildings that will be demolished in FY2005 will be removed after the demolition of these buildings in FY2005.

*RCRA WMU Soils and Groundwater*

Two remediation technologies have been implemented in the WMU area. (1) A demonstration project to develop and test the use of prefabricated vertical drains (PVDs) for the *in situ* remediation of TCE in contaminated groundwater and soils was initiated in 1997. The demonstration project ended in 1999. (2) A bioremediation project was conducted in 2002. Approximately 25,000 pounds of Hydrogen Release Compound (HRC) was delivered through 127 injection points in the WMU using direct push Geoprobe rods. The hydrogen released as a result of these injections can be used by microorganisms to displace the chlorine atoms in TCE. Based upon an evaluation of the performance of the bioremediation project in 2003 after a one-year period, a decision was made to terminate the project since it would not support the 2005 project completion milestone.

Additional secondary COCs within the WMU include the following:

Nitrate ( $\text{NO}_3$ ) and nitrite ( $\text{NO}_2$ ) in groundwater, which are residues of the spent sodium nitrate solution that was disposed of in the WMU former evaporation pond.

VOCs perchloroethylene (PCE) which is attributed to being a component of the technical grade TCE used as a degreasing agent; and dichloroethelene (DCE) and vinyl chloride (VC) which are breakdown products of TCE and PCE.

During FY2004 WMU TCE-contaminated soils will be excavated and treated via low temperature thermal desorption. A groundwater containment and treatment system will be installed to treat contaminated groundwater and prevent offsite migration of contaminated groundwater by the end of FY2005.

## **2.0 REGIONAL CONTEXT RISK-BASED END STATE DESCRIPTION**

The RMI Extrusion Plant site has no immediate residential neighborhood. The nearest resident is located on State Road, approximately 600 feet from the site boundary. The closest residential area is across State Route 11, approximately 1400 feet away. The site is shown in relation to the surrounding regional physical and surface features on Map 2.1b.

### **2.1 Physical and Surface Interface**

#### *Flood Plains*

The plant site is not located within the 100-year flood plain of Lake Erie or the Ashtabula River. The nearest body of surface water is Fields Brook that is located approximately 700 feet north and adjacent to the property. Fields Brook is not shown on the Flood Insurance Rate Map.

#### *State/National Parks*

The site is not located within the boundaries of a state/national park area. The closest community water supply is Lake Erie. The American Water Services intake is located offshore from Walnut Beach west of the Ashtabula River Harbor breakwater that is more than two miles from the site.

#### *Population*

The site has existed in its present location in an industrialized/heavy manufacturing zone for numerous decades; therefore, there is no local "neighborhood". The ethnic diversity, linguistic capabilities and income level of the general populace of the local community reflects typical values for similar towns.

#### *Socioeconomic Issues*

According to 2000 estimates, the population of the City of Ashtabula is approximately 21,000. The percent composition by race is 3.4% Hispanic, 6.7% Black, 88.8% White. Asian & Pacific Islander is less than 0.8%. The gender make-up is 53% female and 47% male. The median per capita income is \$15,200. There are approximately 13,500 households with a median household income of \$26,867. The median home value for the area is \$54,474.

Assuming that the ACP site land use will continue to be for heavy industrial purposes, as it is currently zoned, the adoption of less restrictive radiological cleanup standards will have minimal if any impact on the local population.

### **2.2 Human and Ecological Land Use**

Human and ecological land use for the regional context is depicted on Map 2.2b. The Site property is zoned for use by heavy industry. In addition the land in the immediate vicinity of the site is zoned for either industrial or central business uses. About 4% of the

county is zoned for residential use. In addition, the property does not contain areas that are classified as prime or unique farmland, or farmland of statewide or local importance, based on recent consultation with the Soil Conservation Service, US Department of Agriculture.

As part of a RCRA Facility Investigation (RFI) for the site, RMIES completed an assessment of endangered species and ecologically significant areas that may be affected by the site. Based on this assessment, there are no federal endangered or threatened species, or federal lands managed for ecological value within a 1-mile radius of the site<sup>1</sup>.

The US Department of the Interior Fish and Wildlife Service (FWS) did note that the facility is located within the possible range of the Indiana Bat, although no examples of the species have been noted at the site. Measures recommended by the FWS were implemented to protect potential habitat for the Indiana Bat during remediation of affected areas of the site.

There is one "ecologically significant" area, Walnut Beach Park, which is located on Lake Erie, 2.5 miles northwest of the site. Walnut Beach park contains four (4) threatened species of plants. However, there are no migration pathways of site contaminants which may affect these species.

### **3.0 SITE SPECIFIC RISK-BASED END STATE DESCRIPTION**

Based on current clean-up criteria, ACP site will be remediated for Free Unrestricted Use. RMI, the site owner, has planned the following:

Remediation of radiologically contaminated soils in all areas of the site to unrestricted levels. The unrestricted level of residual contamination remaining on site must meet the ODH requirements and be protective of groundwater and surface water.

Restoration of all contaminated soil areas at the site.

Removal and/or remediation of all contaminated buildings at the site to unrestricted levels.

Removal of all uncontaminated foundations and concrete.

Removal of all contaminated drains, drain lines, sumps, vaults, manholes, trenches, basements, and pits.

Removal or release for unrestricted use of the outfall line in Area D, NPDES building and associated infrastructure.

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<sup>1</sup> RFI Equivalency Document for the RMI Extrusion Plant, Eckenfelder, Inc., August 1989.

Remediation of trichloroethylene/radiologically contaminated soils within the waste management units to unrestricted release levels.

Remediation of site groundwater to unrestricted release levels.

Remediation of impacted adjacent areas, if any.

Again, this end-state, as currently defined in the DP, may be revised to be reflective of an established industrial community.

### **3.1 Physical and Surface Interface**

Site physical and surface features are depicted on Map 3.1b. The RMI Plant site is located on a flat upland surface. The site is underlain by approximately 33 feet of unconsolidated deposits consisting predominantly of clay silt along with thin, localized sand/silt lenses. These deposits are of glacial till origin and overlay the Chagrin Shale bedrock formation.

The predominant surface water feature adjacent to the site include Fields Brook, and its associated tributaries, which flow into the nearby Ashtabula River and then into the Lake Erie. Fields Brook, which drains the Site, is also the major drainage system for the industrialized area of Ashtabula Township and for a large section of the eastern part of the City of Ashtabula.

An escarpment is present approximately 120 feet from the former plant buildings and slopes toward the Fields Brook floodplain. As determined by review of Flood Insurance Rate Maps (FIRMs) and other assessments, the former plant is not located within the 100 year floodplain.

No drinking water wells are located on-site or within a 1,000 foot radius of the site.<sup>2</sup> A topographic map of northern Ashtabula County with locations of active and abandoned water supply and injection wells was obtained from the Ohio Department of Natural Resources (ODNR), Division of Water. The map indicates that the nearest injection well is over 1 mile from the site. Discussions with ODNR personnel have confirmed this conclusion.

An Ashtabula Township Map with locations of oil and gas wells (and dry holes) was obtained from ODNR division of Geological Survey. The township map indicates that the nearest drilling for this purpose occurred about 3,000 feet from the property boundary. Personnel from ODNR verified this in May of 2000. (RCRA Siting Criteria)

### **3.2 Human and Ecological Land Use**

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<sup>2</sup> An exception to this are the non-active PVD wells in the FEP WMU, which are Class V injection wells per OEPA. See RCRA WMU Soils and Groundwater in Section 1.3 of this report.

Human and ecological land use for the site context is depicted on Map 3.2b. The closest community water supply is Lake Erie. The Ohio American Water Services intake is located offshore from Walnut Beach west of the Ashtabula River Harbor breakwater that is more than two miles for the site.

The site is located approximately 1500 feet north of a main east-west rail line operated by CSX. A rail spur (Ashtabula Siding #815) was extended to the ACP site in 2003 to facilitate shipment of low level waste (see Figure 4-1).

### **3.3 Site Context Legal Ownership**

The site is owned and operated by the RMI-Titanium Company and is contaminated with both radiological and hazardous materials resulting from previous operations for the US Department of Energy to shape nuclear materials. DOE's Office of Environmental Restoration and Waste Management (EM) has contracted RMI Titanium Company (Contract No. DE-AC24-93CH10555) to conduct the RMI Decommissioning Project to satisfy DOE's liability by removing all radiological and hazardous contaminants to levels that will allow the site and adjacent areas to be released for unrestricted use. The project will allow RMI to terminate its decommissioning license with the Ohio Department of Health and to achieve closure of a Resource Conservation and Recovery Act Unit located on the RMI property.

Legal ownership of the site and surrounding properties is depicted on Map 3.3b

### **3.4 Site Context Demographics**

The site is located in a sparsely populated, highly industrialized portion of Ashtabula County, Ohio. According to the Ashtabula chamber of Commerce, Ashtabula County has an average of 142 people per square mile and the city of Ashtabula has an average of 2843 people per square mile. The site is located in Ashtabula Township off the East 21<sup>st</sup> street exit of State Route 11.

The closest resident is a house on State Road, approximately 600 feet away. The house is vacant most of the year. The Sts. John and Paul school area is the next closest, located on East 21<sup>st</sup> Street, approximately 1400 feet away. The closest residential area is on Columbus Avenue, approximately 1800 feet away. Population demographics for the areas immediately surrounding the site are shown on Map 3.4b.

## **4.0 HAZARD SPECIFIC DISCUSSION**

A site-wide hazard map (Map 4.0b), showing the location of former process facilities is attached. Also shown are areas of known soil and groundwater contamination, including the RCRA Waste Management Units (WMUs). Attached to this document are site-wide Conceptual Site Models (CSM) depicting end state visions for both the 'unrestricted' and industrial use scenarios (see figures 4.0b2 and 4.1b2). This section provides additional information pertaining to Map 4.0b and the CSMs.

Map 4.0b and subsequent Maps 4.1b thru 4.4b provide additional information on areas of contamination (concern) in the areas of former process facilities where the contamination exists.

The site and immediately adjacent areas are divided into Areas A-G (refer to Map 3.1b). This was done to delineate areas of the site, in accordance with USNRC NUREG 5849 guidance, as 'affected' or 'unaffected' from former operations, which was based on process knowledge and characterization data. The following Areas of the site have been demarcated:

- Area A This area is outside the site property line proper. Area A was determined to be 'unaffected' and free released. This has been accepted by the ODH.
- Area B This area includes the majority of former process areas, including portions of the RCRA WMUs. Area B is 'affected' by past operations and has been partially remediated.
- Area C This area includes a portion of the RCRA WMUs and the Fields Brook Flood Plain. The sub-area labeled Area C West is outside the site's property line and is owned by the City of Ashtabula. Area C West has been remediated, free released and has been accepted by the ODH. The remaining portions of Area C have been partially remediated, specifically the Fields Brook flood plain.
- Area D This area includes the site's NPDES final discharge outfall and has been remediated.
- Area E A portion of Area E was determined to be 'affected', and has been remediated and free released. This has been accepted by the ODH.
- Area F Area F was determined to be 'unaffected' and free released. This has been accepted by the ODH.
- Area G This area is outside the site property line proper. Area G was determined to be 'unaffected' and free released. This has been accepted by the ODH.

#### **4.1 Hazard Area 1 - Contaminated Buildings and Non-WMU Soils**

Maps 4.0b thru 4.4b show the location of buildings, which formerly housed the extrusion press and related process activities. As a result of decommissioning and demolition activities, only eleven of the buildings from former extrusion operations still remain. These include the following:

- Wastewater Treatment Plant,
- Soil Storage Building,
- Portal Trailer,
- Locker Trailer,
- Modular Lab,
- Lunch Trailer,
- Modular Office,
- Guard House,
- Operations Building,
- NPDES Building and
- Sequencing Batch Reactor.

The end state vision entails demolition of these remaining facilities, with the exception of the Operations Building and the Guard House, which are owned by RMI. These two buildings currently have been remediated and the Operations Building has been released by ODH for unrestricted use. Figure 4.1 below provides an aerial view of the site as it existed on 7/30/03.

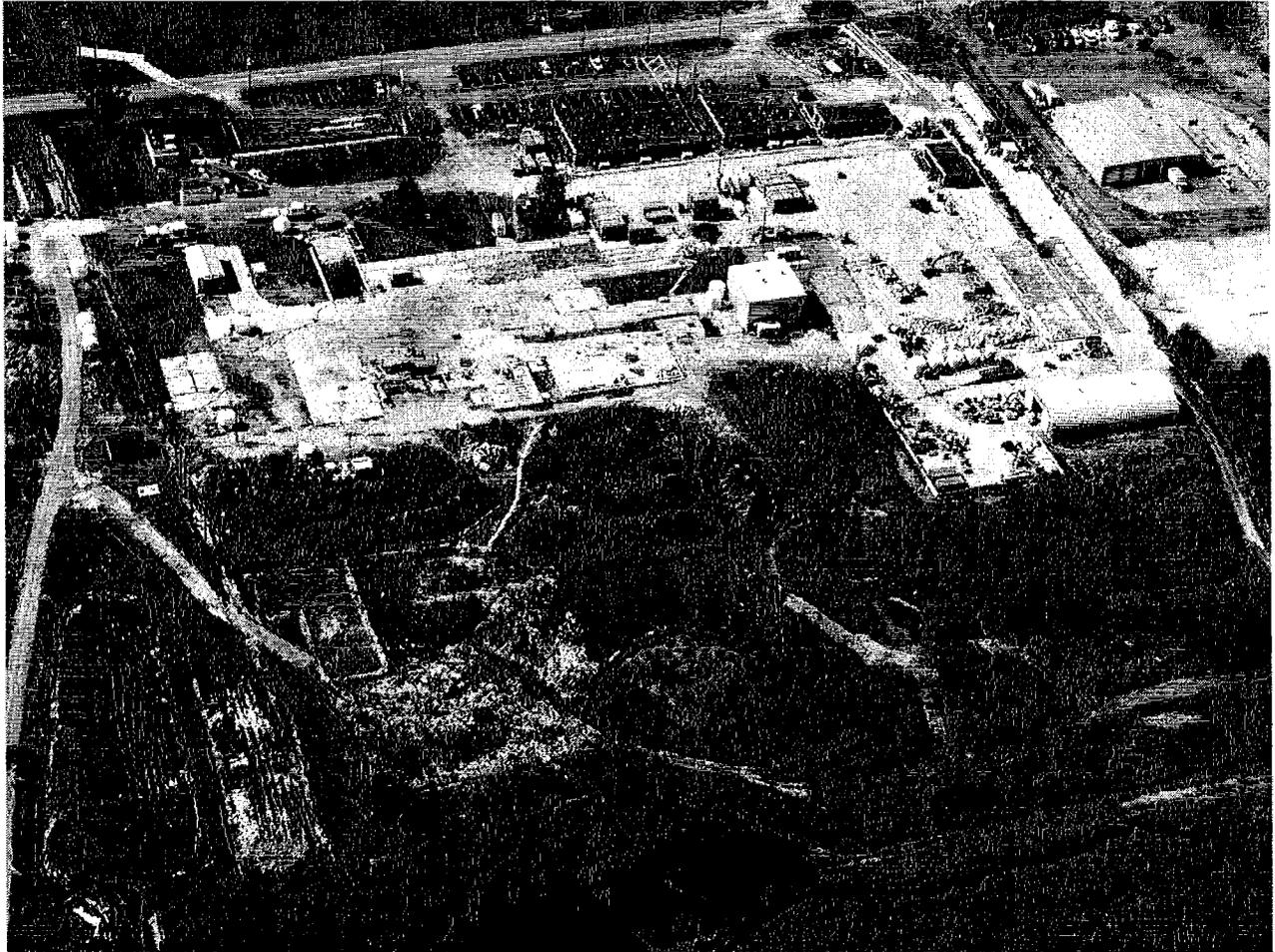


Figure 4-1, Aerial view of the ACP Extrusion Plant site showing the extent of building demolition, as of 7/30/03 (view is to the south). Fields Brook is visible in the lower right.

Since this photograph was taken, additional remediation work has included demolition of the RCRA Storage Building, as well as concrete slabs for the following facilities:

- High/Low Bay Building and Locker Room/Offices,
- Truck Ramp,
- RF-03 Building,
- Northeast Warehouse,
- RF-06 Building,
- Stack #3 and #4 Buildings,

- Tool Crib,
- Stack #1 Building,
- RCRA Storage Building and
- Burn Pad.

The current end state vision for the site includes the removal of all contaminated buildings (except as noted), slabs, foundations, and utilities. Confirmatory surveys will show no residual soil contamination above levels for unrestricted use. This scenario is depicted in Figure 4-2 below.

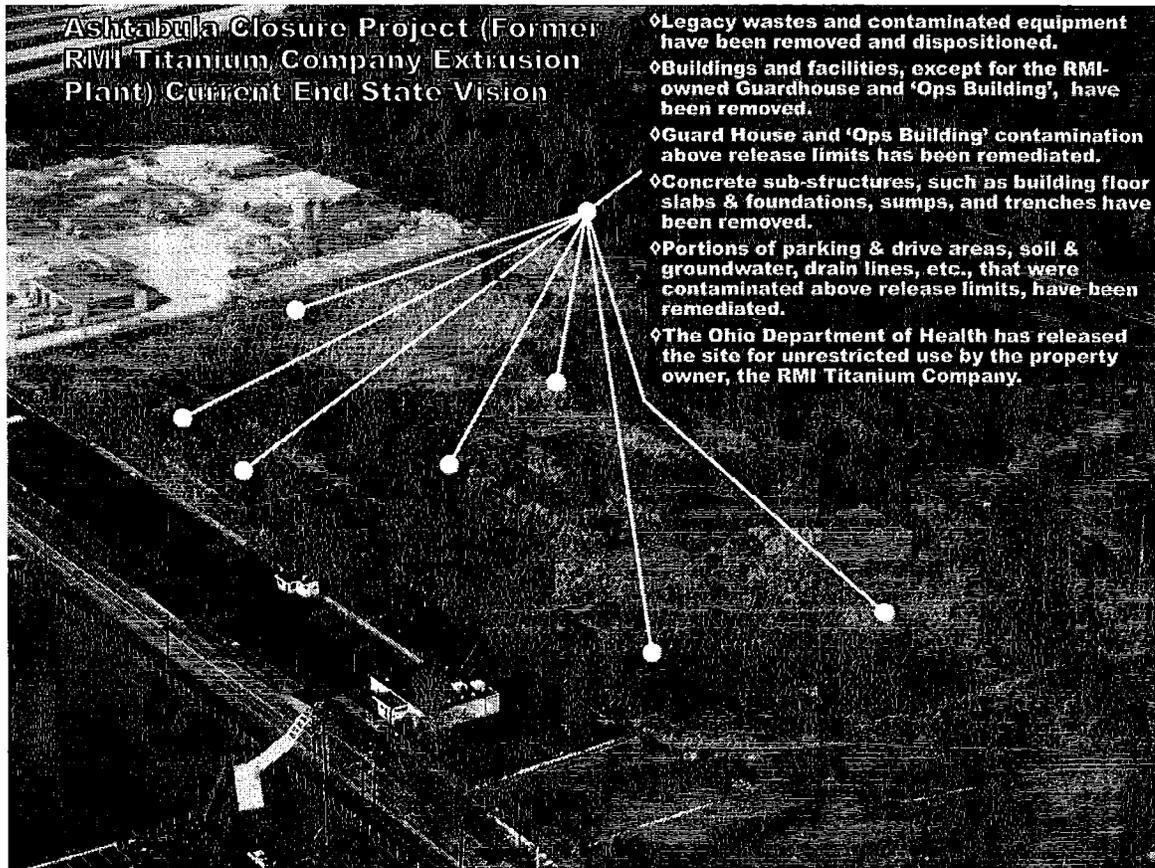


Figure 4-2, Aerial view of the ACP Extrusion Plant site showing current end state vision (artist's rendition).

The two remaining structures shown in Figure 4-2 include the Guard House and Operations Building.

As previously noted, the end state vision includes the removal of utilities, including sumps, drains and conduits. There are approximated 147 cubic yards (excluding adjacent contaminated soils) of contaminated or suspected contaminated underground utilities that are planned for removal and disposal. The quantity of underground utilities currently planned for demolition includes the following:

<u>Utility</u>	<u>Pipe Diameter</u> <u>(Inches)</u>	<u>Approximate</u> <u>Linear Feet</u>
Process Drains/ Storm Sewers	30	550
	18	975
	12	20
	10	20
	8	575
	6	475
Sanitary Sewer	8	232
	6	200
	4	274
Telephone Wireway	---	540
Electrical Wireway	---	250
Water Supply	12	175
	8	344
	6	581
Natural Gas	3	324
	2	271
Argon	3	115

#### 4.1.1 Radiological Contamination

Systematic radiological surveys were performed on all major RMI buildings in 1991 as part of a comprehensive effort to characterize each building. Results of the building survey measurements are documented in the Decommissioning Plan for the RMI Extrusion Plant, approved by the USNRC<sup>3</sup>.

Based on the survey data, radiological contamination was determined to be non-uniformly distributed within building surfaces. Since the extrusion and forging processes generated uranium oxide dusts or fumes, localized contamination was distributed due to the unique production operations. In addition, surface oxidation of the uranium produced a removable contamination. The particulate contamination and superficial oxides settled on or was transferred to personnel clothing (e.g., boots, gloves) equipment, buildings, and adjacent surface soils. The results of the radiological surveys indicated that the radiological contamination is highest in buildings where uranium was processed and where associated process equipment was used and/or stored.

Based on production processes and sample results, uranium, with varying weight percent of U-235, is the primary contaminant. The primary form of the radiological contaminant is uranium oxide from operation of the extrusion press, forging equipment, vapor degreaser, pickling tank and ancillary equipment. In addition, operation of the cutting and lathe equipment generated dusts or fumes that contributed to the spread of contamination. Based on the survey data, approximately 3,800 cubic yards of building material was contaminated.

<sup>3</sup> *Decommissioning Plan for the RMI Titanium Company Extrusion Plant, Revision 1, RMI Environmental Services, April 1995.*

Soils outside the RCRA FEPA WMU are contaminated with radioactive material, primarily uranium. Map 4.1b indicates the areas of the site where uranium soil contamination exceeds the various end state soil cleanup criteria presented in Table 1. Due to completed remediation activities, these areas are now limited to Area B and portions of Area C (near its boundary with Area B) that have not been previously remediated. The contaminated areas include surface contamination, sub-surface contamination (associated with building foundations and buried utilities), and staged soil piles.

The total volume of remaining contaminated soil is estimated at 32,100 tons, which includes 9,000 tons of soil staged in piles. This total also includes 6,315 tons of soil from the RCRA FEPA WMU that is also contaminated with hazardous constituents.

Groundwater, outside of the RCRA WMU groundwater plume, currently meets site cleanup criteria for unrestricted. However, surface water samples from drain lines and shallow ditches, indicate that surface water runoff from radioactively contaminated areas exceeds current site cleanup criteria.

#### 4.1.2 Non-Radiological Contamination

Some operations and maintenance activities at the RMI Extrusion Plant also resulted in the generation of hazardous waste. Because the majority of the hazardous wastes were also contaminated with uranium, they were classified as mixed wastes. The following RCRA hazardous wastes were generated as result of past operation and remediation activities:

- Salt Bath waste containing Barium from billet heating operations,
- Spent halogenated solvents from degreasing and floor stripping operations,
- Lead containing oils from Extrusion Press and Lathe operations,
- TCE contaminated groundwater.

RMI possesses a RCRA Hazardous Waste Management Permit to store and/or treat these wastes before disposal. The RCRA Permit requires that prior to demolition and disposal, buildings, structures and equipment where hazardous wastes were stored or treated, be de-contaminated and sampled to ensure contamination from RCRA constituents has been removed.

In addition to RCRA wastes, RMIES completed inspections and sampling to identify equipment and areas with asbestos containing material (ACM) and polychlorinated biphenyls (PCBs). The majority of PCB and asbestos wastes have been shipped off-site for treatment and disposal.

Outside of the RCRA WMU (see Section 4.2 below), there is no known RCRA contamination, which exceed site cleanup criteria.

## 4.2 Hazard Area 2 - RCRA Waste Management Unit (WMU) Soils and Groundwater

The OEPA Hazardous Waste Permit for the RMI Extrusion Plant requires that corrective action be completed for trichloroethylene (TCE) contaminated soils and groundwater associated with the operation of a former evaporation pond. The pond was used for disposal (evaporation) of sodium nitrate solutions from uranium extrusion operations. In addition to TCE, the soils and groundwater surrounding the former evaporation pond are also contaminated with uranium and Technetium-99. The Hazardous Waste Permit identifies three WMUs requiring corrective action. These include:

- 1) the former evaporation pond area (FEPA),
- 2) the groundwater plume associated with the former evaporation pond, and
- 3) the seepage pond at the base of the escarpment located north of the RMI Extrusion Plant.

The soils within the FEPA and the groundwater plume associated with the FEPA exceed the cleanup criteria established in the site's Hazardous Waste Permit and Radioactive Material License, as indicated below:

- 4.2.1 Soils in the area of the FEPA exceed the site's cleanup criteria for Uranium, Tc-99 and TCE. The areas exceeding the limits are indicated for each contaminant on Maps 4.1b, 4.2b and 4.3c respectively. The contaminated areas are different for each contaminant but overlap, producing areas contaminated with a single contaminant, to volumes containing a mixture of contaminants, which exceed the cleanup criteria.
- 4.2.2 The groundwater plume associated with the FEPA is contaminated with TCE, Uranium, Tc-99 and nitrate. The extent of ground contamination is indicated on Map 4.4b. The groundwater cleanup limits represent USEPA Maximum Contaminant Levels (MCL) for drinking water.
- 4.2.3 The soils in the seepage pond at the base of the escarpment have been remediated to cleanup criteria for Uranium and Tc-99. TCE soil contamination in the seepage pond is below the cleanup criteria. Groundwater contamination beneath the seepage pond is below cleanup criteria for Uranium and Tc-99 and is at the cleanup level for TCE.

The groundwater flow at the site is generally to the north and northwest, but is significantly retarded due to low hydraulic conductivity. However, due to 1) a seasonally high water table, 2) the presence of 'silt' soil zones of higher conductivity in the glacial till, and 3) changes in topography due to the presence of the escarpment, the potential exists that contaminated groundwater can migrate through seeps at the escarpment or as surface water runoff to the Fields Brook flood plain. Surface water sample results from ditches or depressions near the FEPA exceed the site cleanup criteria for TCE, Uranium and Tc-99.

## **5.0 REFERENCES**

1. (USDOE) Contract DE-AC24-93CH10555
2. ODH Radioactive Materials License 11900040004
3. *Decommissioning Plan for RMI Titanium Company Extrusion Plant*, RMI Environmental Services, April 1995
4. *Guidance for Developing Risk-Based, Site-Specific End State Vision*, USDOE, September 11, 2003
5. *NUREG 5849, Manual for Conducting Radiological Surveys in Support of License Termination*, USNRC, June 1992
6. Ohio Hazardous Waste Facility Installation and Operation Permit, No. 02-04-0678, 8/13/02

## **6.0 ATTACHMENTS**

1. Map 2.1b, Ashtabula, Ohio Regional Physical and Surface Interface – End State
2. Map 2.2b, Ashtabula, Ohio Regional Human and Ecological Land Use – End State
3. Map 3.1b, Ashtabula, Ohio Site Physical and Surface Interface – End State
4. Map 3.2b, Ashtabula, Ohio Site Human and Ecological Land Use – End State
5. Map 3.3b, Ashtabula, Ohio Site Legal Ownership – End State
6. Map 3.4b, Ashtabula, Ohio Site Demographics – End State
7. Figure 4.0b2, ACP Conceptual Site Model – Unrestricted Use RBES
8. Figure 4.1b2, ACP Conceptual Site Model – Industrial Use RBES